Published in final edited form as:

Arch Suicide Res. 2007 ; 11(2): 203–210. doi:10.1080/13811110600894652.

Psychometric Properties of the Scale for Suicide Ideation in China

Jie Zhang and

Department of Sociology, State University of New York College at Buffalo, Buffalo, NY, USA

Gregory K. Brown

Department of Psychiatry, University of Pennsylvania, Philadelphia, PA, USA

Abstract

The Chinese version of Scale for Suicide Ideation (SSI; Beck, Kovacs, & Weissman, 1979) was examined with high school students ($n = 292$) in rural China. Results indicated that the SSI had high internal reliability and high item-total correlations. The SSI was highly correlated with measures of trait anxiety, hopelessness, and favorable attitude towards suicide. These findings indicated that the Chinese version of the SSI has excellent psychometric properties for measuring suicidal ideation in Chinese populations.

Keywords

adolescent; China; suicide intent

Suicide is a major public health problem as indicated by almost 1 million suicides per year world-wide (IOM, 2002). In China, suicide is responsible for about 287,000 deaths every year (Phillips, Li, & Zhang, 2002) and constitutes an urgent public health problem given China's ever growing populations and increased impact on the world. Research studies conducted in the United States have identified suicidal ideation as a risk factor for suicide attempts and completed suicide (e.g. Beck, Brown, & Steer, 1997; Brown, Beck, Steer et al, 2000; de Man & Leduc, 1995; Kumar & Steer, 1995). However, very few studies have scientifically examined suicidal ideation as a risk factor for suicide or attempted suicide in China. One reason for this limited epidemiological research involves the lack of standardized, validated measures of suicide ideation with Chinese samples.

A very limited number of studies published in either English or Chinese have addressed the prevalence of suicidal ideation and its correlates in Chinese populations. Research studies have indicated that estimates of the prevalence rates of suicide ideation in China widely varies. For example, Hesketh, Ding, and Jenkins (2002) found that 16% of middle school students admitted to suicide ideation, and Xu et al. (2004) found 14.6% of college students to have suicidal ideation. In contrast, Zhang and Jin (1996) reported that 34.3% of Chinese college students had thought of suicide at least once in the past few years. Differences in the prevalence rates among studies may be due to a variety of methodological differences or sample bias. One plausible explanation for these variations is that different measures of suicidal ideation have been used in these studies.

Several other studies in China, published in either English or Chinese, have reported correlates of suicidal ideation and its relationship with suicide. Stewart et al. (1999, 2005) found hopelessness and depressed mood to be related to suicidal ideation among adolescents in Hong Kong as much as in the United States. Liu and Xiao (2002) found that anxiety and depressive moods were risk factors of repeat suicide attempts among Chinese college students. In addition, Domino, Su, and Lee Johnson (2002) found that attitude toward suicide was related to suicidal ideation among Chinese young women as much as it was for their American counterparts. In some previous studies by one of the current authors, suicidal ideation was found to be related to depression, self-esteem, physical health, and attitudes toward suicide in different Chinese samples (Jin & Zhang, 1998; Zhang & Jin, 1996). Although using different measures of suicidal ideation, these studies found positive associations between suicidal ideation and measures of depression, anxiety, hopelessness, and favorable attitudes towards suicide. These findings suggest that using similar measures or constructs in future studies may produce promising results in validating other measures of suicidal ideation.

The Scale for Suicide Ideation (SSI; Beck, Kovacs, & Weissman, 1979) is one of the most widely used measures of suicide ideation in the West. The SSI is a 19-item, interviewer-administered rating scale that measures the current intensity of specific attitudes, behaviors, and plans to commit suicide. The SSI has been standardized with adult psychiatric patients in the United States (Beck, Brown, & Steer, 1997). Although the SSI was originally designed for psychiatric populations (Beck, Kovacs, & Weissman, 1979), it has been validated for use among non-psychiatric samples (Bruce, Ten Have, Reynolds et al., 2004). Further, the scale can also be used for self-report data collection (Beck & Steer, 1991; Beck, Steer, & Ranieri, 1988). For example, the SSI has been administered to college students (Clum & Curtin, 1993; Clum & Yang, 1995; Dixon, Heppner, & Anderson, 1991) including African American college students (Blanton-Lacy, 1997; Molock, Kimbrought, Lacy et al., 1994), adolescents (Nock & Kazdin, 2002) including Chinese adolescents (Zhang & Norvilitis, 2002), and inmates (Blaauw, Arensman, Kraaij et al., 2002).

The SSI has been found to have moderately high internal consistency with Cronbach coefficient alphas ranging from .84 (Beck, Brown, & Steer, 1997) to .89 (Beck, Kovacs, & Weissman, 1979). The SSI also has high inter-rater reliability with correlations ranging from .83 (Beck, Kovacs, & Weissman, 1979) to .98 (Beck, Brown, & Steer, 1997). Moreover, the SSI is one of the few suicide assessment instruments to have documented the predictive validity for completed suicide. Specifically, psychiatric patients who scored in the higher risk category were approximately seven times more likely to actually commit suicide than those who scored in the lower risk category (Brown, Beck, Steer et al., 2000). A self-report version of the SSI has also been developed. The internal reliability, test-retest stability and concurrent validity of this self-report measure has been established as well (Beck & Steer, 1991).

The present study proposes to examine the psychometric properties of the SSI using a sample of rural high school students in China. This sample was selected for this study given that this demographic group is one of the highest risk groups for suicide in China (Phillips, Li, & Zhang, 2002; Zhang, 2000). There are two reasons for adopting a Western-developed instrument to study suicide ideation in China: (a) The reliability and validity of the SSI has been well-established in the West, and (b) the consistency of measurement across study samples allows for more accurate comparison of data than studies that utilize different measures of ideation. Although culturally-specific measures of suicide ideation are warranted, the measurement of ideation using similar instruments fosters the cross-cultural accumulation of scientific knowledge.

METHOD

Participants

Participants were recruited from a high school in Zhuanghe County of Dalian City, Liaoning Province, China. All senior class students who attended school on the day of data collection were asked to participate in the study, and all of them agreed to do it. The age range of the senior students in the rural high school is from 17 to 21 with a mean of 19. Chinese rural children typically begin their education at the age of seven or older and attend school for 12 years. About 85–88% of the participants are from rural households, and about 91% of them are not religious. This observation is consistent with our earlier finding for Chinese adolescents (Zhang & Jin, 1996). The characteristics of the sample are displayed in Table 1.

The majority of the sample identified themselves as rural residence status (88%), and 54% of all participants were male. All participants were single and had no marital history. Over 90% of them did not believe in any religion, which is typical of general populations in China (Zhang, Conwell, Zhou et al., 2004).

Study Procedures

Participants were asked to complete a self-administered questionnaire in May 2004. The measures and procedures for the data collection were approved by the Institutional Review Board of the State University of New York College at Buffalo and by Dalian Medical University. Prior to study participation, a consent form was read and signed by each respondent.

Measures

The Scale for Suicide Ideation (SSI) is a 19-item instrument of the current intensity of specific attitudes, behaviors, and plans to commit suicide (Beck, Kovacs, & Weissman, 1979). Each item consists of three options graded according to the intensity of the suicidality and rated on a 3-point scale ranging from 0 to 2 (no ideation to strong ideation). The ratings are then summed to yield a total score, which ranges from 0 to 38. Individual items assess characteristics such as wish to die, desire to make an active or passive suicide attempt, duration and frequency of ideation, sense of control over making an attempt, number of deterrents, and amount of actual preparation for a contemplated attempt.

Other measures that were administered include the Beck Hopelessness Scale (BHS; Beck, Weissman, Lester et al, 1974; Beck & Steer, 1993). The BHS consists of 20 true-false statements designed to assess the extent of positive and negative beliefs about the future. Predictive validity of the BHS for completed suicide has been established with psychiatric patients (Brown, Beck, Steer et al., 2000). Using data collected from the present study, the BHS had high internal reliability (Cronbach's $\alpha = .95$). In addition, the Trait Anxiety subscale of the State-Trait Anxiety Inventory (STAI; Spielberger, 1983; Iwata & Higuchi, 2000) was administered to assess general feelings of anxiety-proneness. The Trait Anxiety subscale also had high internal reliability (Cronbach's $\alpha = .82$) for the present study. Respondents' attitude towards suicide was also measured using a single item from the World Values Survey (2004). This item measures the degree to which a respondent believes that suicide can be justified and the responses range from (1) "never" to (10) "always."

Translations and back-translation were performed numerous times on all measures by bilingual scholars. To ensure that the original meaning of the measures was precisely translated into Chinese, native speakers of English were consulted to resolve discrepancies that occurred during the translation and back-translation procedure.

RESULTS

Descriptive Information

Table 2 describes ratings on the scale for each item by males and females as well as for the entire sample. To describe the prevalence of each item among the Chinese respondents, frequencies are also provided for the lowest score (0) and highest score (2) for each item by males and females as well as the whole sample. For the entire sample, the mean SSI total score was 4.84 ($SD = 5.02$). Females ($M = 5.66$, $SD = 5.58$) were found to have significantly higher SSI total scores than males ($M = 4.14$, $SD = 4.39$, $t = 2.55$, $p < .01$).

Reliability

For the entire sample ($n = 292$), the results indicated that the SSI had high internal reliability (Cronbach's $\alpha = .85$; .85; Guttman split-half reliability = .83). In addition, moderate to moderately high item-total correlations were found (see Table 2). The correlation between each item score and the total score is an indication of the fit of the item. Usually, the higher the correlation between the two, the better fit the item is to the scale. The lowest item-total correlations were for Items 5 and 7 (passive suicidal desire and frequency of ideation) and the highest item-total correlation was for Item 12 (specificity of the method).

Validity

Evidence of the validity of the SSI was supported by positive and moderate correlations between the SSI and the Beck Hopelessness Scale ($r = .38$, $p < .001$) and the Trait Anxiety subscale of the STAI ($r = .40$, $p < .001$). The SSI was also moderately correlated with suicide attitude measured by the World Values Survey ($r = .33$, $p < .001$).

To obtain a further estimate of the ability of the trait anxiety and hopelessness to predict suicidal ideation, the entire sample was divided into approximately two groups of equal size based on the median scores for both trait anxiety and hopelessness. The mean SSI total scores for the four groups were examined (see Table 3). The results indicated that, irrespective of whether the trait anxiety scores were higher or lower, the groups with high hopelessness scores had significantly higher mean suicide ideation scores ($F = 35.68$, $df = 1$, $p < .000$).

Another way to estimate the construct validity of the SSI was to dichotomize the SSI and compare the means of trait anxiety and hopelessness for suicide ideators and non-ideators. However, instead of using the median to divide the subjects, the scale was dichotomized using some theory-based principles suggested by Beck, Brown, and Steer (1997). First, the sample was divided into 53 non-ideators and 239 suicide ideators based on the total score of the 19 items. Ideators were defined as those individuals who had a total SSI score greater than zero and non-ideators were defined as those with a total SSI score equal to zero. A second way to split the sample was based on the respondent's answer to item 4 and item 5 of the SSI Using Beck and Steer's (1991) method, a score greater than zero on either SSI item 4 or item 5 indicated an intent to commit suicide ($n = 160$).

Respondents who scored a zero on both item 4 and item 5 were classified as not having any intent to commit suicide ($n = 132$). Table 4 illustrates and compares the mean scores of trait anxiety, hopelessness, and favorable attitude toward suicide on the subjects who responded differently on the SSI. The results indicated that those individuals with suicide ideation and suicide intent had significantly higher mean scores on trait anxiety and a favorable attitude toward suicide than those individuals without any suicide ideation or suicide intent. In addition, the results revealed that individuals with suicide intent had significantly higher

scores on hopelessness than individuals without suicide intent. Together, these analyses support the criterion validity of the SSI in Chinese culture.

DISCUSSION

Although Beck and his colleagues (1979) designed the Scale for Suicide Ideation originally for psychiatric patients to assess their suicide risks, it has also been validated for use among non-psychiatric populations (Bruce, Ten Have, Reynolds et al, 2004). Further, although the scale was originally designed in an interview format, it can be used as a self-report measure with some-modification (Beck & Steer, 1991; Beck, Steer, & Ranieri, 1988). We assessed the psychometric characteristics of the SSI with community high school adolescents and young adults in rural China using the self-report version of the SSI. The findings of the present study provide support for the use of the SSI using a self-report format with a community sample of Chinese adolescents and young adults.

Specifically, the present study provided evidence for the reliability and validity of the Chinese version of Scale for Suicide Ideation (SSI) with (nonpsychiatric) high school students in China. With respect to convergent validity, the SSI was positively correlated with variables that were hypothesized to be related to suicidal ideation, such as trait anxiety, hopelessness, and favorable attitude toward suicide. It should be noted that only the SSI-Current measure was examined in the present study. Further research that investigates the psychometric properties of the SSI-Worst measure with Chinese populations is warranted given that the SSI-Worst was found to be a stronger predictor of complete suicide than the SSI-Current in the United States (Beck, Brown, & Steer, 1997).

Our results are consistent with an earlier study with a Chinese sample. Zhang and Norvilitis (2002) administered the Chinese version of SSI to 273 college students in a psychological well-being study in China and found that the SSI was positively correlated with depression and negatively related to self-esteem and social support. The mean SSI scores for the college student sample ($M = 4.44$, $SD = 4.42$) was found to be quite similar to the mean scores obtained for the current high school sample ($M = 4.84$, $SD = 5.02$). Both of these studies indicate that the Chinese version of Scale for Suicide Ideation may be a reliable and valid instrument for measuring suicide ideation in Chinese-speaking populations.

Despite these encouraging results, the present study has limited generalizability. First, our study was conducted with rural Chinese adolescents. Future studies with older, urban samples are needed to further assess the generalizability of the measure in Chinese populations. Second, the study did not employ a test-retest reliability which is a typical technique to ensure that the results are stable over time. Additionally, the SSI needs to be evaluated with psychiatric patients in China in order to further assess its validity with populations for whom the SSI was developed in the United States (Beck, Kovacs, & Weissman, 1979).

Acknowledgments

The authors thank Dr. Jia Shuhua, Dr. Zhou Li, and Ms. Xia Hongwei at Dalian Medical University in Dalian, China for their assistance in data collection and data management.

References

- Beck AT, Brown GK, Steer RA. Psychometric characteristics of the scale for suicide ideation with psychiatric outpatients. *Behavior Research & Therapy*. 1997; 35:1039–1046.
- Beck AT, Kovacs M, Weissman A. Assessment of suicidal intention: The scale for suicide ideation. *Journal of Consulting and Clinical Psychology*. 1979; 47:343–352. [PubMed: 469082]

- Beck, AT.; Steer, RA. Manual for the Beck Scale for Suicide Ideation. San Antonio, TX: Psychological Corporation; 1991.
- Beck, AT.; Steer, RA. Manual for the Beck Hopelessness Scale. San Antonio, TX: Psychological Corporation; 1993.
- Beck AT, Steer RA, Ranieri WF. Scale for Suicide Ideation: Psychometric properties of a self-report version. *Journal of Clinical Psychology*. 1988; 44(4):499–505. [PubMed: 3170753]
- Beck AT, Weissman A, Lester D, et al. The measurement of pessimism: the hopelessness scale. *Journal of Consulting and Clinical Psychology*. 1974; 42:861–865. [PubMed: 4436473]
- Blaauw E, Arensman E, Kraaij V, et al. Traumatic life events and suicide risk among jail inmates: The influence of types of events, time period and significant others. *Journal of Traumatic Stress*. 2002; 15:6–16.
- Blanton-Lacy M. The validity of the Beck Depression Inventory, Scale for Suicide Ideation, and Hopelessness Scale in an African-American college population. *Dissertations Abstracts International*. 1997; 58:409.
- Brown GK, Beck AT, Steer RA, et al. Risk factors for suicide in psychiatric outpatients: A 20-year prospective study. *Journal of Consulting and Clinical Psychology*. 2000; 68:371–377. [PubMed: 10883553]
- Bruce ML, Ten Have T, Reynolds RF, et al. Reducing suicidal ideation and depressive symptoms in depressed older primary care patients: A randomized controlled trial. *Journal of the American Medical Association*. 2004; 291:1081–1091. [PubMed: 14996777]
- Clum GA, Curtin L. Validity and reactivity of a system of self-monitoring suicide ideation. *Journal of Psychopathology and Behavioral Assessment*. 1993; 15:375–385.
- Clum GA, Yang B. Additional support for the reliability and validity of the Modified Scale for Suicide Ideation. *Psychological Assessment*. 1995; 7:122–125.
- De Man AF, Leduc CP. Suicidal ideation in high school students. *Journal of Clinical Psychology*. 1995; 51:173–181. [PubMed: 7797639]
- Dixon WA, Heppner PP, Anderson WP. Problem-solving appraisal, stress, hopelessness, and suicide ideation in a college population. *Journal of Counseling Psychology*. 1991; 38:51–56.
- Domino G, Su A, Lee Johnson S. Psychosocial correlates of suicide ideation: A comparison of Chinese and U.S. rural women. *Omega: Journal of Death & Dying*. 2001–2002; 44:371–389.
- Hesketh T, Ding QJ, Jenkins R. Suicide ideation in Chinese adolescents. *Social Psychiatry and Psychiatric Epidemiology*. 2002; 37:230–235. [PubMed: 12107715]
- IOM (Ins time of Medicine). Reducing suicide: An American imperative. Washington, DC: National Academy Press; 2002.
- Iwata N, Higuchi HR. Responses of Japanese and American university students to the STAI items that assess the presence or absence of anxiety. *Journal of Personality Assessment*. 2000; 74:48–62. [PubMed: 10779932]
- Jin S, Zhang J. The effects of physical and psychological well-being on suicidal ideation. *Journal of Clinical Psychology*. 1998; 54:401–413. [PubMed: 9623745]
- Kumar G, Steer RA. Psychosocial correlates of suicidal ideation in adolescent psychiatric inpatients. *Suicide and Life-Threatening Behavior*. 1995; 25:339–346. [PubMed: 8553414]
- Liu L, Xiao S. A follow-up study of suicide attempters. *Chinese Mental Health Journal*. 2002; 16:253–256. (In Chinese).
- Molock SD, Kimbrought R, Lacy MB, et al. Suicidal behavior among African American college students: A preliminary study. *Journal of Black Psychology*. 1994; 20:234–251.
- Nock MK, Kazdin AE. Examination of affective, cognitive, and behavioral factors and suicide-related outcomes in children and young adolescents. *Journal of Clinical Child Adolescent Psychology*. 2002; 31:48–58.
- Phillips MR, Li X, Zhang Y. Suicide rates in China, 1995–99. *The Lancet*. 2002; 359:835–840.
- Spielberger, CD. Manual for the State-Trait Anxiety Inventory (Form Y). Palo Alto, CA: Consulting Psychologists Press, Inc; 1983.

- Stewart SM, Kennard BD, Lee PWH, et al. Hopelessness and suicidal ideation among adolescents in two cultures. *Journal of Child Psychology and Psychiatry*. 2005; 46(4):364–372. [PubMed: 15819645]
- Stewart SM, Lam TH, Betson C, et al. Suicide ideation and its relationship to depressed mood in a community sample of adolescents in Hong Kong. *Suicide and Life Threatening Behavior*. 1999; 29:227–240. [PubMed: 10531636]
- World Value Survey. 1999–2002 World Value Survey Questionnaire. 2004. accessible at <http://wvs.isr.umich.edu/assets/wvs2000.pdf>, accessed at July 12, 2004
- Xu HL, Xiao SY, Feng SS, et al. Risk factors for suicide attempt among college students at Central South University. *Zhonghua Liu Xing Bing Xue Za Zhi*. 2004; 25:288–291. (In Chinese). [PubMed: 15231193]
- Zhang J. Understanding Chinese suicide with a comparison of national data. *American Review of China Studies*. 2000; 1:9–29.
- Zhang J, Conwell Y, Zhou L, et al. Culture, risk factors and suicide in rural China: a psychological autopsy case control study. *Acta Psychiatrica Scandinavica*. 2004; 110(6):430–437. [PubMed: 15521827]
- Zhang J, Jin S. Determinants of suicide ideation: A comparison of Chinese and American college students. *Adolescence*. 1996; 31:451–467. [PubMed: 8726903]
- Zhang J, Norvilitis JM. Measuring Chinese psychological well-being with Western developed instruments. *Journal of Personality Assessment*. 2002; 79:492–511. [PubMed: 12511017]

TABLE 1

Demographic Information for High School Students

Variable	Male (n = 158)	Female (n = 134)
Age (Range Year)	17–21	17–20
Age (Mean Year)	19.0	18.9
Education (Range Year)	9–13	10–13
Education (Mean Year)	11.2	11.0
Residence (% Rural Status)	87.8	84.7
Religion (% Atheist)	90.4	91.0

Descriptive Information and Internal Consistency of the Scale for Suicide Ideation

	Total sample (N = 292)				Males (n = 158)				Females (n = 134)				
	Mean (SD)		Frequency		Mean (SD)		Frequency		Mean (SD)		Frequency		
	0	2	0	2	0	2	0	2	0	2	0	2	
1. Wish to live	.09 (.32)	269	4		.07 (.30)	149	2		.12 (.37)	120	2		.39**
2. Wish to die	.47 (.62)	176	19		.36 (.54)	106	5		.58 (.68)	70	14		.51**
3. Reasons to live/die	.18 (.47)	251	11		.15 (.40)	138	3		.22 (.54)	113	8		.56**
4. Desire to attempt	.41 (.62)	193	20		.31 (.53)	114	5		.52 (.69)	79	15		.58**
5. Passive desire	.52 (.75)	185	45		.46 (.72)	106	21		.59 (.78)	79	24		.28*
6. Time during	.56 (.64)	147	14		.47 (.63)	90	5		.66 (.65)	57	9		.57**
7. Time frequency	.06 (.30)	278	5		.06 (.34)	150	4		.05 (.26)	128	1		.28**
8. Attitude to ideation	.45 (.65)	186	25		.38 (.57)	104	7		.52 (.73)	82	18		.46**
9. Control over action	.13 (.39)	258	6		.09 (.29)	142	0		.18 (.49)	116	6		.48**
10. Deterrents to attempt	.14 (.40)	254	5		.17 (.43)	132	3		.10 (.35)	122	2		.32**
11. Reason for attempt	.38 (.57)	194	13		.26 (.49)	120	4		.51 (.62)	74	9		.39**
12. Method: Specificity	.25 (.50)	227	9		.19 (.45)	131	4		.32 (.54)	96	5		.63**
13. Method: Availability	.18 (.53)	257	19		.19 (.54)	138	11		.17 (.51)	119	8		.40**
14. Capability to attempt	.29 (.54)	220	13		.31 (.58)	117	9		.26 (.51)	103	4		.44**
15. Expect/anticipate	.22 (.50)	238	11		.22 (.52)	130	8		.22 (.47)	108	3		.61**
16. Actual preparation	.03 (.18)	283	1		.03 (.16)	152	0		.03 (.21)	131	1		.36**
17. Suicide note	.07 (.32)	277	6		.04 (.29)	152	3		.09 (.36)	125	3		.38**
18. Final acts	.05 (.22)	278	1		.04 (.24)	150	1		.04 (.21)	128	0		.31**
19. Deception/concealment	.41 (.76)	221	49		.35 (.73)	124	23		.47 (.80)	97	26		.50**

**
 $p < .01$.

**
 $p < .01$.

TABLE 3

Mean SSI Total Scores by Level of Hopelessness and Trait Anxiety

	Hopelessness	
	Low (0 thru 5)	High (6 thru 18)
Trait anxiety		
Low (27 thru 45)	3.0 (n = 121)	4.2 (n = 25)
High (46 thru 75)	5.6 (n = 46)	7.0 (n = 98)

TABLE 4

Means Scores on Trait Anxiety, Hopelessness, and Favorable Attitude toward Suicide as Function of Suicidal Ideation and Suicidal Intent

	Suicidal ideation		<i>t</i> -value	Suicidal intent		<i>t</i> -value
	No (n = 51)	Yes (n = 239)		No (n = 132)	Yes (n = 160)	
Trait anxiety	43.8 (SD = 8.1)	46.4 (SD = 8.4)	2.1*	43.4 (SD = 7.8)	48.0 (SD = 8.4)	4.9***
Hopelessness	5.2 (SD = 3.7)	6.2 (SD = 4.1)	1.7	5.1 (SD = 3.7)	6.7 (SD = 4.2)	3.3***
Suicide attitude	3.7 (SD = 2.7)	4.4 (SD = 2.8)	1.9*	3.8 (SD = 2.6)	4.7 (SD = 2.8)	2.8**

* $p < .05$,

** $p < .01$,

*** $p < .001$.